(No Model.)

G. T. SMITH.

Middlings Purifier.

No. 236,101. Patented Dec. 28, 1880.

Fig. 1.

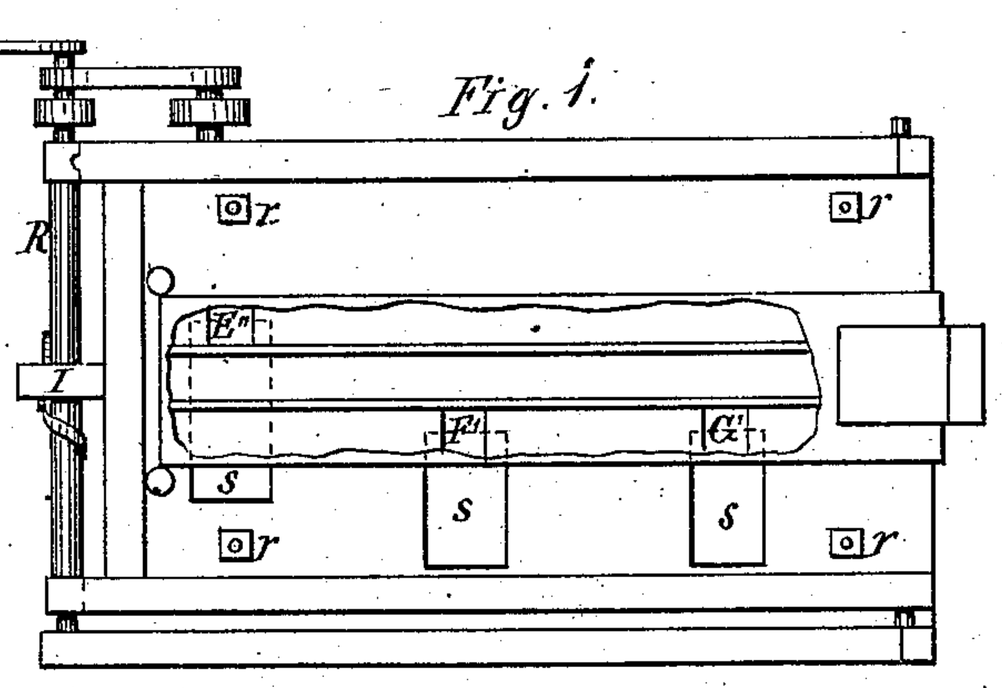


Fig. 3.

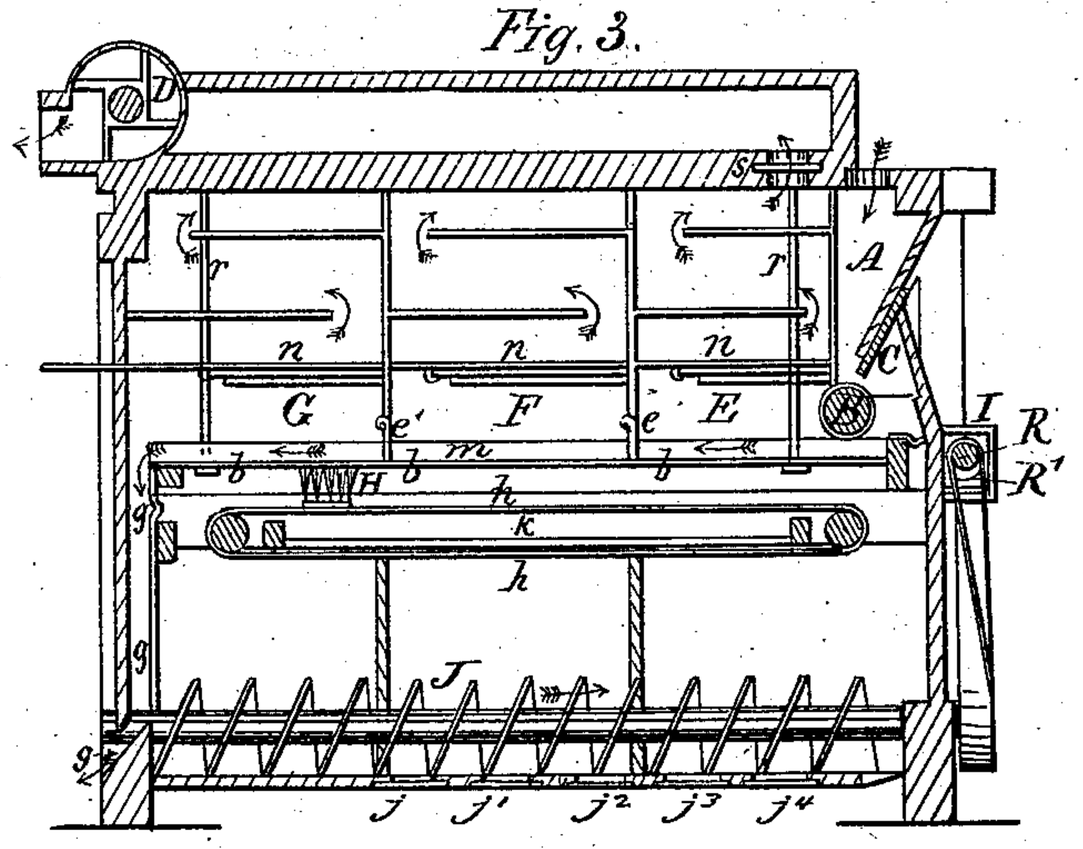
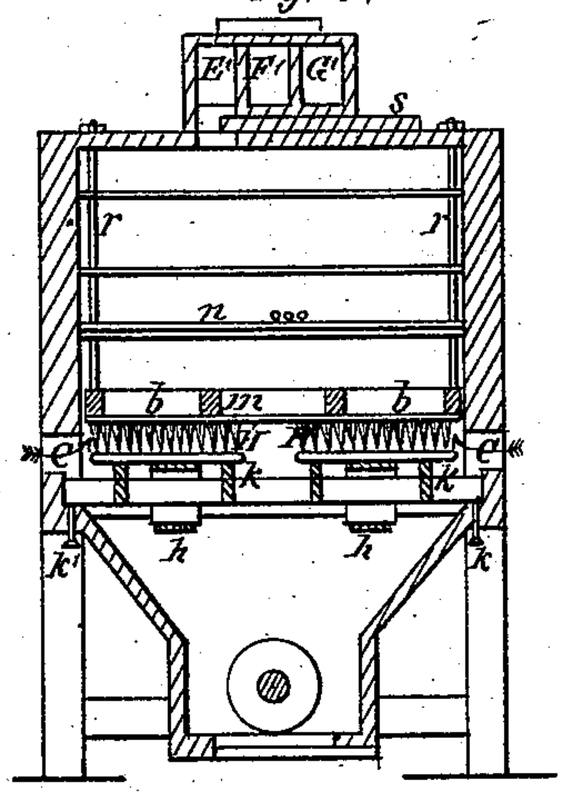


Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE T. SMITH, OF BLOOMINGTON, ILLINOIS.

MIDDLINGS-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 236,101, dated December 28, 1880.

Application filed November 2, 1880, being a division of an application filed January 4, 1873; original application filed July 12, 1871. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. SMITH, a citizen of the United States, residing at Bloomington, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Middlings-Purifiers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a plan view of my machine with a portion of the air-flue removed. Fig. 2 is a vertical transverse section, and Fig. 3 is a vertical longitudinal section.

In the drawings, A represents a hopper, into which the middlings to be treated are delivered from an elevator, or by any other means, and from which they are fed by the roller B to the shaker, the rate of feed being regulated by a slide, *c*. The shaker or bolt *b* is suspended from the frame-work or the sides of the machine by pivoted links *r r*, and has a reciprocating motion imparted to it by eccentric R on shaft R′ and the inclosing-box I.

m (see Fig. 2) are longitudinal ribs extending from end to end of the shaker, above the bolt-cloth, said cloth being attached to the under side of these ribs *m* by means of tacks or otherwise. The ribs perform two functions, to wit: they serve to keep the lower surface of the cloth in a plane, or substantially in a plane, thus insuring the uniform operation of the brushes upon the entire width of the cloth, and they also assist in maintaining a uniform thickness in the layer of the material upon the upper surface of the cloth by keeping the cloth more nearly flat than it would be if it were allowed to sag in the center, and also by preserving substantially the same division of the middlings that is made at the head of the shaker by the feed-roller.

The bolting-cloth on the shaker is of different degrees of fineness. I usually employ three or four numbers, the finest being at the head, the coarser next, and so on.

The space above the shaker, and within the frame-work, is tightly inclosed, forming an air-chamber, which is divided into sections E, F, and G by means of transverse partitions.

A fan, D, is employed to draw air-currents through the shaker in an upward direction. Three air-spouts, E′ F′ G′, lead from the fan to the air-chamber, one for each section, and by means of valves or dampers S the strength of the air-currents through the bolting-cloth under each section may be regulated. Each section of the air-chamber is provided with shelves *n*, arranged in zigzag form, as indicated in Fig. 3. The air-currents, after leaving the shaker, pass around the shelves in the direction indicated by the arrows in this figure.

H is a brush carried by belts, cords, or chains *h*, which are driven by rollers, the brush being supported on ways *k*, which keep it in close contact with the lower side of the bolting-cloth during its passage in one direction from the head to the tail of the machine.

J is a conveyer working in a case having a number of cut-off slides or gates, $j\ j'\ j^2\ j^3\ j^4$, through which the middlings may be delivered, as will be hereinafter set forth.

The middlings are fed to the shaker through the hopper A, and are thoroughly agitated as they pass over the fine cloth at the receiving end of the shaker, the finer portions sifting through this cloth, coarser ones sifting through the next coarser cloth, and so on. As there is a current of air continually passing through the bolt it (the air-current) will cause the very fine middlings to adhere to the threads of which the cloth is composed, and thus close up the meshes to such an extent as to interfere materially with the operation of the machine. In order to obviate this difficulty I employ the brushes H to keep the bolting-cloth clean. As the air-currents pass upward through the bolting-cloth and the layer of middlings thereon they carry with them a portion of the finer specks, particles of bran, and other material, and deposit more or less of the same upon the zigzag shelves, this deposit varying in quality, according to the coarseness of the middlings and the strength of the air-current.

In order to produce satisfactory results with a middlings-purifier, I have found that the middlings should be placed upon a fine bolting-cloth, where they can be thoroughly agi-

tated and subjected to the operation of an upward current of air, one object in employing a fine cloth at the receiving end of the shaker being that the coarse particles of bran may not fall through, it being impracticable to use so strong a current of air at this point as would be required to carry off or even to "float" the coarse and heavy particles over the bolt-cloth, as such current would carry away and waste much of the fine middlings and flour. The next section of cloth is of coarser mesh, and a stronger air-current is employed to carry away some of the bran, which would otherwise fall through. The next section of the cloth may be coarser, with heavier draft, and so on, the air-chamber being divided into sections corresponding substantially to the sections of the bolting-cloth.

Upon referring to the drawings and the above description, it will be readily understood that by the use of the valves or dampers S the strength of the air-currents may be so regulated as to take out from each section of the bolting-cloth only such material as the operator shall find necessary to effect the desired purification of the middlings, and it will be found that by a frequent examination of the material deposited in that portion of the air-chamber or air-trunk through which the air passes after leaving the bolts he will be enabled to so regulate the strength of the air-currents through the different sections of the bolt-cloth as to greatly reduce the amount of valuable material which is taken out by the air, and it is apparent that by the employment of my construction a large portion of this valuable material will be deposited as the air-current is moving forward after leaving the bolter. Of course the amount of material thus saved depends largely upon the character of the grinding and the other treatment of the middlings before they are delivered to the purifier.

I do not desire to claim in this patent, which is a division of my original application, filed July 12, 1871, any invention other than those which are specifically set forth in the claims, reserving the right to claim all other patentable subject-matter in other divisions.

What I do claim is—

1. The combination, in a middlings-purifier, of a reciprocating screen clothed with cloths of different degrees of fineness, a fan for causing air-currents to pass upward through the screen, and the chest which incloses the screen and forms an air-trunk, by which the air entering below is directed through and escapes above the screen through a contracted tubular discharge, and provided with apertures which are made of different areas opposite the various sections of the screen, for the purpose of regulating the force of the current through such sections, substantially as set forth.

2. The combination, in a middlings-purifier, of a reciprocating screen clothed with cloths of different degrees of fineness, a suction-fan placed above the screen, a chest which incloses the screen and forms an air-trunk between the air-openings below and the fan above the screen, and adjustable openings placed opposite the different sections of the screen, whereby the force of the current may be regulated according to the texture of the cloth and material to be treated, and the material raised by the fan is carried away through the tubular mouth of the fan-case, substantially as set forth.

3. The combination, in a middlings-purifier, of a fan and reciprocating screen clothed with cloths of different degrees of fineness, a chest which incloses the screen and forms an air-trunk, causing the entire current to pass through the screen, and constructed with transversely-elongated and adjustable openings extending across the cloth, so as to equalize the action of the atmospheric currents upon the material traversing the sieve, substantially as set forth.

4. In a middlings-purifier, in combination with a suction-fan and reciprocating screen clothed with cloths of different degrees of fineness, a chest forming a portion of a continuous wind-trunk inclosing the screen, and an auxiliary wind-trunk connecting the fan with the interior of the chest through a series of openings of different areas placed opposite to the different sections of the bolting-cloth, substantially as set forth.

5. The combination, in a middlings-purifier, of a reciprocating screen clothed with cloths of progressively coarser mesh, a fan for causing an air-current through the screen, a chest which incloses the screen and forms part of a continuous wind-trunk to conduct the air put in motion by the fan through the entire extent of the screen, and controlling its delivery after it has passed through the screen, and a contracted tubular air-discharge, whereby a film of middlings is subjected to a current of air uniform across the width of the screen and continuously increasing in force as the residuum becomes continually coarser and the cloth proportionally increases in coarseness of mesh, substantially as set forth.

6. The combination, in a middlings-purifier, of a screen having cloths of different degrees of fineness, a fan, and chest which incloses the screen and directs the air-currents through the entire series of cloths, while the middlings pass from the finer to the coarser sections, a hopper which collects the middlings as they fall through the cloths, and a conveyer and slide for remingling the middlings from two or more cloths after they have separately passed through cloths adapted to their several sizes, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE T. SMITH.

Witnesses:
WM. GARDNER,
WM. H. DICKEY.